CLAIMS

I/We claim:

[c1] 1. A microelectronic device, comprising:

a microelectronic component having an integrated circuit and bond-pads coupled to the integrated circuit;

a plurality of electrical couplers coupled to the bond-pads of the microelectronic component; and

an underfill layer covering at least a portion of the plurality of electrical couplers, wherein the underfill comprises a binder and a plurality of electrically charged filler elements in the binder.

[c2] 2. The microelectronic device of claim 1 wherein the electrically charged filler elements comprise silica.

[c3] 3. The microelectronic device of claim 1 wherein the underfill layer includes a first zone having a first concentration of electrically charged filler elements and a second zone having a second concentration of electrically charged filler elements different than the first concentration.

[c4] 4. The microelectronic device of claim 1 wherein the underfill layer includes a first zone having a first concentration of electrically charged filler elements and a second zone having a second concentration of electrically charged filler elements different than the first concentration, and wherein the binder is at least partially cured binder.

[c5] 5. The microelectronic device of claim 1 wherein the electrical couplers include a proximal end proximate to the microelectronic component and a distal end opposite the proximal end, wherein the distal ends of the electrical couplers

define a plane that divides the underfill layer into a first zone between the plane and the microelectronic component and a second zone opposite the first zone, and wherein the first zone has a first concentration of electrically charged filler elements and the second zone has a second concentration of electrically charged filler elements less than the first concentration.

[c6] 6. The microelectronic device of claim 1 wherein the electrical couplers include a proximal end proximate to the microelectronic component and a distal end opposite the proximal end, wherein the distal ends of the electrical couplers define a plane that divides the underfill layer into a first zone between the plane and the microelectronic component and a second zone opposite the first zone, and wherein the first zone has a first concentration of electrically charged filler elements and the second zone has a second concentration of electrically charged filler elements greater than the first concentration.

[c7] 7. The microelectronic device of claim 1 wherein the electrical couplers include a proximal end proximate to the microelectronic component and a distal end opposite the proximal end, wherein underfill layer further includes a first surface proximate to the microelectronic component, a second surface opposite the first surface, a first zone having a first concentration of electrically charged filler elements, and a second zone having a second concentration of electrically charged filler elements less than the first concentration, wherein the second zone is generally hemispherical and extends between the second surface and the distal end of one of the electrical couplers.

[c8] 8. The microelectronic device of claim 1 wherein the electrical couplers comprise solder balls electrically coupled to the microelectronic component.

[c9] 9. The microelectronic device of claim 1 wherein the microelectronic component comprises a microelectronic die.

[c10] 10. A microelectronic workpiece, comprising:

a plurality of microelectronic components;

a plurality of electrical couplers arranged in discrete arrays that are electrically coupled to corresponding microelectronic components; and

an underfill layer over at least a portion of the plurality of electrical couplers, wherein the underfill layer comprises a binder and a plurality of electrically charged filler elements in the binder, and wherein the underfill layer includes a first zone having a first concentration of the electrically charged filler elements and a second zone having a second concentration of electrically charged filler elements different than the first concentration.

[c11] 11. The microelectronic workpiece of claim 10 wherein the electrically charged filler elements comprise silica.

[c12] 12. The microelectronic workpiece of claim 10 wherein the binder is at least partially cured.

[c13] 13. The microelectronic workpiece of claim 10 wherein the electrical couplers include a proximal end proximate to the microelectronic component and a distal end opposite the proximal end, wherein the distal ends of the electrical couplers define a plane that divides the underfill layer into the first zone between the plane and the microelectronic component and the second zone opposite the first zone, and wherein the first concentration of electrically charged filler elements is less than the second concentration of electrically charged filler elements.

[c14] 14. The microelectronic workpiece of claim 10 wherein the electrical couplers include a proximal end proximate to the microelectronic component and

a distal end opposite the proximal end, wherein the distal ends of the electrical couplers define a plane that divides the underfill layer into the first zone between the plane and the microelectronic component and the second zone opposite the first zone, and wherein the first concentration of electrically charged filler elements is greater than the second concentration of electrically charged filler elements.

[c15] 15. The microelectronic workpiece of claim 10 wherein the electrical couplers include a proximal end proximate to the microelectronic component and a distal end opposite the proximal end, wherein underfill layer further includes a first surface proximate to the microelectronic component and a second surface opposite the first surface, and wherein the second zone is generally hemispherical and extends between the second surface and the distal end of one of the electrical couplers.

[c16] 16. The microelectronic workpiece of claim 10 wherein the microelectronic components comprise microelectronic dies.

[c17] 17. A microelectronic device assembly, comprising:

a microelectronic component having an integrated circuit and bond-pads coupled to the integrated circuit;

a plurality of electrical couplers coupled to the bond-pads of the microelectronic component;

a substrate having contacts that are coupled to corresponding electrical couplers; and

an underfill layer between the microelectronic component and the substrate, wherein the underfill comprises a binder and a plurality of electrically charged filler elements in the binder.

[c18] 18. The assembly of claim 17 wherein the electrically charged filler elements comprise silica.

[c19] 19. The assembly of claim 17 wherein the electrically charged filler elements are distributed generally uniformly throughout the underfill layer.

[c20] 20. The assembly of claim 17 wherein the underfill layer includes a first zone having a first concentration of electrically charged filler elements and a second zone having a second concentration of electrically charged filler elements different than the first concentration.

[c21] 21. The assembly of claim 17 wherein a plane divides the underfill layer into a first zone having a first concentration of electrically charged filler elements and a second zone having a second concentration of electrically charged filler elements less than the first concentration, wherein the plane is generally parallel to the microelectronic component and is between the microelectronic component and the substrate, and wherein the first zone includes the portion of the underfill layer between the plane and the microelectronic component and the second zone includes the portion of the underfill layer between the plane and the substrate.

[c22] 22. The assembly of claim 17 wherein a plane divides the underfill layer into a first zone having a first concentration of electrically charged filler elements and a second zone having a second concentration of electrically charged filler elements greater than the first concentration, wherein the plane is generally parallel to the microelectronic component and is between the microelectronic component and the substrate, and wherein the first zone includes the portion of the underfill layer between the plane and the microelectronic component and the second zone includes the portion of the underfill layer between the plane and the substrate.

[c23] 23. The assembly of claim 17 wherein a plane divides the underfill layer into a first zone having a first coefficient of thermal expansion and a second zone having a second coefficient of thermal expansion greater than the first coefficient, wherein the plane is generally parallel to the microelectronic component and is between the microelectronic component and the substrate, and wherein the first zone includes the portion of the underfill layer between the plane and the microelectronic component and the second zone includes the portion of the underfill layer between the plane and the substrate.

[c24] 24. The assembly of claim 17 wherein a plane divides the underfill layer into a first zone having a first coefficient of thermal expansion and a second zone having a second coefficient of thermal expansion less than the first coefficient, wherein the plane is generally parallel to the microelectronic component and is between the microelectronic component and the substrate, and wherein the first zone includes the portion of the underfill layer between the plane and the microelectronic component and the second zone includes the portion of the underfill layer between the plane and the substrate.

[c25] 25. The assembly of claim 17 wherein the electrical couplers comprise solder balls electrically coupled to the microelectronic component.

[c26] 26. The assembly of claim 17 wherein the microelectronic component comprises a microelectronic die.

[c27] 27. A microelectronic device assembly, comprising:

a microelectronic component having a plurality of pads;

a plurality of electrical couplers electrically coupled to corresponding pads;

a substrate having contacts that are coupled to corresponding electrical couplers; and

an underfill layer between the microelectronic component and the substrate, wherein the underfill comprises a binder and a plurality of electrically charged filler elements in the binder, and wherein the plurality of electrically charged filler elements are distributed generally uniformly throughout the underfill.

[c28] 28. The assembly of claim 27 wherein the electrically charged filler elements comprise silica.

[c29] 29. The assembly of claim 27 wherein the electrical couplers comprise solder balls.

[c30] 30. The assembly of claim 27 wherein the microelectronic component comprises a microelectronic die.

[c31] 31. A microelectronic device assembly, comprising:

a microelectronic component having a plurality of pads;

a plurality of electrical couplers electrically coupled to the plurality of pads;

a substrate having contacts that are coupled to the electrical couplers; and

an underfill layer between the microelectronic component and the substrate, wherein the underfill comprises a binder and a plurality of electrically charged filler elements in the binder, and wherein the underfill layer includes a first zone having a first concentration of electrically charged filler elements and a second zone having a second concentration of electrically charged filler elements different than the first concentration.

[c32] 32. The assembly of claim 31 wherein the electrically charged filler elements comprise silica.

[c33] 33. The assembly of claim 31 wherein a plane divides the underfill layer into the first zone and the second zone, wherein the plane is generally parallel to the microelectronic component and is between the microelectronic component and the substrate, wherein the first zone includes the portion of the underfill layer between the plane and the microelectronic component and the second zone includes the portion of the underfill layer between the plane and the substrate, and wherein the first concentration of electrically charged filler elements is greater than the second concentration.

[c34] 34. The assembly of claim 31 wherein a plane divides the underfill layer into the first zone and the second zone, wherein the plane is generally parallel to the microelectronic component and is between the microelectronic component and the substrate, wherein the first zone includes the portion of the underfill layer between the plane and the microelectronic component and the second zone includes the portion of the underfill layer between the plane and the substrate, and wherein the first concentration of electrically charged filler elements is less than the second concentration.

[c35] 35. The assembly of claim 31 wherein a plane divides the underfill layer into the first zone and the second zone, wherein the plane is generally parallel to the microelectronic component and is between the microelectronic component and the substrate, wherein the first zone includes the portion of the underfill layer between the plane and the microelectronic component and the second zone includes the portion of the underfill layer between the plane and the substrate, and wherein the first zone has a first coefficient of thermal expansion and the second zone has a second coefficient of thermal expansion less than the first coefficient.

[c36] 36. The assembly of claim 31 wherein a plane divides the underfill layer into the first zone and the second zone, wherein the plane is generally parallel to

the microelectronic component and is between the microelectronic component and the substrate, wherein the first zone includes the portion of the underfill layer between the plane and the microelectronic component and the second zone includes the portion of the underfill layer between the plane and the substrate, and wherein the first zone has a first coefficient of thermal expansion and the second zone has a second coefficient of thermal expansion greater than the first coefficient.

[c37] 37. A method for disposing underfill on a microelectronic device having a plurality of electrical couplers, the method comprising flowing an underfill material including a plurality of electrically charged filler elements onto the microelectronic device and covering at least a portion of the electrical couplers.

[c38] 38. The method of claim 37, further comprising manipulating at least a portion of the electrically charged filler elements.

[c39] 39. The method of claim 37 wherein the electrically charged filler elements comprise silica, and wherein flowing the underfill material comprises flowing the underfill material including a plurality of electrically charged silica filler elements.

[c40] 40. The method of claim 37 wherein the microelectronic device comprises a microelectronic die, and wherein flowing the underfill material comprises flowing the underfill material onto the microelectronic die.

[c41] 41. A method for disposing underfill material on a microelectronic device having a plurality of electrical couplers, the method comprising:

depositing an underfill layer onto the microelectronic device and covering at least a portion of the electrical couplers, the underfill layer

comprising a binder and a plurality of electrically charged filler elements in the binder; and

applying an electric field to the underfill layer to manipulate at least a portion of the electrically charged filler elements.

[c42] 42. The method of claim 41 wherein the electrically charged filler elements comprise silica, and wherein depositing the underfill layer comprises depositing the underfill layer having a plurality of electrically charged silica filler elements.

[c43] 43. The method of claim 41, further comprising at least partially curing the underfill layer after applying the electric field.

[c44] 44. The method of claim 41 wherein applying the electric field comprises moving at least a portion of the electrically charged filler elements from a first zone to a second zone.

[c45] 45. The method of claim 41 wherein the microelectronic device comprises a microelectronic component, wherein the electrical couplers include a proximal end proximate to the microelectronic component and a distal end opposite the proximal end, wherein the distal ends of the electrical couplers define a plane that divides the underfill layer into a first zone between the plane and the microelectronic component and a second zone opposite the first zone, and wherein applying the electric field comprises moving at least a portion of the electrically charged filler elements from the first zone to the second zone.

[c46] 46. The method of claim 41 wherein the microelectronic device comprises a microelectronic component, wherein the electrical couplers include a proximal end proximate to the microelectronic component and a distal end opposite the proximal end, wherein the distal ends of the electrical couplers

define a plane that divides the underfill layer into a first zone between the plane and the microelectronic component and a second zone opposite the first zone, wherein applying the electric field comprises moving at least a portion of the electrically charged filler elements from the first zone to the second zone, and wherein the method further comprises:

at least partially curing the underfill layer; and

removing the first zone of the underfill layer from the microelectronic device.

[c47] 47. The method of claim 41 wherein the microelectronic device comprises a microelectronic component, wherein the electrical couplers include a proximal end proximate to the microelectronic component and a distal end opposite the proximal end, wherein the distal ends of the electrical couplers define a plane that divides the underfill layer into a first zone between the plane and the microelectronic component and a second zone opposite the first zone, and wherein applying the electric field comprises moving at least a portion of the electrically charged filler elements from the second zone to the first zone.

[c48] 48. The method of claim 41 wherein the microelectronic device comprises a microelectronic component, wherein the electrical couplers include a proximal end proximate to the microelectronic component and a distal end opposite the proximal end, wherein underfill layer includes a first surface proximate to the microelectronic component, a second surface opposite the first surface, a first zone, and a second zone extending between the second surface and the distal end of one of the electrical couplers, wherein the second zone is generally hemispherical, and wherein applying the electric field comprises moving at least a portion of the electrically charged filler elements from the second zone to the first zone.

[c49] 49. The method of claim 41, further comprising:
at least partially curing the underfill layer;
attaching the microelectronic device to a substrate; and
reflowing the microelectronic device.

[c50] 50. The method of claim 41, further comprising:
at least partially curing the underfill layer; and
dicing the microelectronic device.

[c51] 51. A method for disposing underfill material on a microelectronic device having a plurality of electrical couplers, the method comprising:
covering at least a portion of the electrical couplers of the microelectronic device with an underfill layer including a matrix and a plurality of electrically charged filler elements; and
moving at least a portion of the electrically charged filler elements within the underfill by applying an electric field to the underfill layer.

[c52] 52. The method of claim 51 wherein the electrically charged filler elements comprise silica, and wherein covering the electrical couplers comprises depositing the underfill layer including a plurality of electrically charged silica filler elements.

[c53] 53. The method of claim 51 wherein the microelectronic device comprises a microelectronic component, wherein the electrical couplers include a proximal end proximate to the microelectronic component and a distal end opposite the proximal end, wherein the distal ends of the electrical couplers define a plane that divides the underfill layer into a first zone between the plane and the microelectronic component and a second zone opposite the first zone, and wherein moving the electrically charged filler elements comprises moving at

least a portion of the electrically charged filler elements from the first zone to the second zone.

[c54] 54. The method of claim 51 wherein the microelectronic device comprises a microelectronic component, wherein the electrical couplers include a proximal end proximate to the microelectronic component and a distal end opposite the proximal end, wherein the distal ends of the electrical couplers define a plane that divides the underfill layer into a first zone between the plane and the microelectronic component and a second zone opposite the first zone, and wherein moving the electrically charged filler elements comprises moving at least a portion of the electrically charged filler elements from the second zone to the first zone.

[c55] 55. The method of claim 51 wherein the microelectronic device comprises a microelectronic component, wherein the electrical couplers include a proximal end proximate to the microelectronic component and a distal end opposite the proximal end, wherein underfill layer includes a first surface proximate to the microelectronic component, a second surface opposite the first surface, a first zone, and a second zone extending between the second surface and the distal end of one of the electrical couplers, wherein the second zone is generally hemispherical, and wherein moving the electrically charged filler elements comprises moving at least a portion of the electrically charged filler elements from the second zone to the first zone.

[c56] 56. A method for attaching a substrate to a microelectronic device including a microelectronic component and a plurality of electrical couplers electrically coupled to the microelectronic component, the method comprising:

flowing an underfill material including a plurality of electrically charged filler elements onto the microelectronic device and covering at least a portion of the electrical couplers;

applying an electric field to the underfill material to move at least a portion of the electrically charged filler elements within the underfill material;

at least partially curing the underfill material; and

attaching a contact of the substrate to one of the plurality of electrical couplers of the microelectronic device.

[c57] 57. The method of claim 56 wherein attaching the substrate to the microelectronic device comprises forming a fillet with the underfill material.

[c58] 58. The method of claim 56 wherein the microelectronic device comprises a microelectronic component, wherein the electrical couplers include a proximal end proximate to the microelectronic component and a distal end opposite the proximal end, wherein the distal ends of the electrical couplers define a plane that divides the underfill material into a first zone between the plane and the microelectronic component and a second zone opposite the first zone, and wherein applying the electric field comprises moving at least a portion of the electrically charged filler elements from the second zone to the first zone.

[c59] 59. The method of claim 56 wherein the microelectronic device includes a microelectronic component, wherein the electrical couplers include a proximal end proximate to the microelectronic component and a distal end opposite the proximal end, wherein underfill material includes a first surface proximate to the microelectronic component, a second surface opposite the first surface, a first zone, and a second zone extending between the second surface and the distal end of one of the electrical couplers, wherein the second zone is generally hemispherical, and wherein applying the electric field comprises moving at least a portion of the electrically charged filler elements from the second zone to the first zone.

[c60] 60. A method of underfilling a microelectronic device assembly including a microelectronic component, a substrate, and a plurality of electrical couplers coupling the microelectronic component to the substrate, the method comprising:

disposing an underfill layer including a plurality of electrically charged filler elements between the microelectronic component and the substrate; and

moving at least a portion of the plurality of electrically charged filler elements within the underfill layer by applying an electric field to the underfill layer.

[c61] 61. The method of claim 60 wherein the electrically charged filler elements comprise silica, and wherein disposing the underfill layer comprises disposing the underfill layer including a plurality of electrically charged silica filler elements.

[c62] 62. The method of claim 60 wherein moving the filler elements comprises moving at least a portion of the electrically charged filler elements from a first zone in the underfill layer to a second zone in the underfill layer.

[c63] 63. The method of claim 60 wherein a plane divides the underfill layer into a first zone having a first concentration of electrically charged filler elements and a second zone having a second concentration of electrically charged filler elements, wherein the plane is generally parallel to the microelectronic component and is between the microelectronic component and the substrate, wherein the first zone includes the portion of the underfill layer between the plane and the microelectronic component and the second zone includes the portion of the underfill layer between the plane and the substrate, and wherein moving the filler elements comprises moving at least a portion of the electrically charged filler elements from the first zone to the second zone so that the first concentration of electrically charged filler elements is less than the second concentration.

[c64] 64. The method of claim 60 wherein a plane divides the underfill layer into a first zone having a first concentration of electrically charged filler elements and a second zone having a second concentration of electrically charged filler elements, wherein the plane is generally parallel to the microelectronic component and is between the microelectronic component and the substrate, wherein the first zone includes the portion of the underfill layer between the plane and the microelectronic component and the second zone includes the portion of the underfill layer between the plane and the substrate, and wherein moving the filler elements comprises moving at least a portion of the electrically charged filler elements from the second zone to the first zone so that the first concentration of electrically charged filler elements is greater than the second concentration.

[c65] 65. The method of claim 60 wherein a plane divides the underfill layer into a first zone having a first coefficient of thermal expansion and a second zone having a second coefficient of thermal expansion, wherein the plane is generally parallel to the microelectronic component and is between the microelectronic component and the substrate, wherein the first zone includes the portion of the underfill layer between the plane and the microelectronic component and the second zone includes the portion of the underfill layer between the plane and the substrate, and wherein moving the filler elements comprises moving at least a portion of the electrically charged filler elements from the first zone to the second zone so that the first coefficient of thermal expansion is greater than the second coefficient of thermal expansion.

[c66] 66. The method of claim 60 wherein a plane divides the underfill layer into a first zone having a first coefficient of thermal expansion and a second zone having a second coefficient of thermal expansion, wherein the plane is generally parallel to the microelectronic component and is between the microelectronic component and the substrate, wherein the first zone includes the portion of the underfill layer between the plane and the microelectronic component and the

second zone includes the portion of the underfill layer between the plane and the substrate, and wherein moving the filler elements comprises moving at least a portion of the electrically charged filler elements from the second zone to the first zone so that the first coefficient of thermal expansion is less than the second coefficient of thermal expansion.

[c67] 67. A method of underfilling a microelectronic device assembly, the method comprising:

disposing an underfill layer including a plurality of electrically charged filler elements between a microelectronic component and a substrate coupled to the microelectronic component by electrical couplers; and

applying an electric field to the underfill layer to manipulate at least a portion of the electrically charged filler elements.

[c68] 68. The method of claim 67 wherein the electrically charged filler elements comprise silica, and wherein disposing the underfill layer comprises disposing the underfill layer including a plurality of electrically charged silica filler elements.

[c69] 69. The method of claim 67 wherein applying the electric field comprises moving at least a portion of the electrically charged filler elements within the underfill layer from a first zone to a second zone.

[c70] 70. The method of claim 67 wherein a plane divides the underfill layer into a first zone having a first concentration of electrically charged filler elements and a second zone having a second concentration of electrically charged filler elements, wherein the plane is generally parallel to the microelectronic component and is between the microelectronic component and the substrate, wherein the first zone includes the portion of the underfill layer between the plane and the microelectronic component and the second zone includes the portion of

the underfill layer between the plane and the substrate, and wherein applying the electric field comprises moving at least a portion of the electrically charged filler elements from the first zone to the second zone so that the first concentration of electrically charged filler elements is less than the second concentration.

[c71] 71. The method of claim 67 wherein a plane divides the underfill layer into a first zone having a first concentration of electrically charged filler elements and a second zone having a second concentration of electrically charged filler elements, wherein the plane is generally parallel to the microelectronic component and is between the microelectronic component and the substrate, wherein the first zone includes the portion of the underfill layer between the plane and the microelectronic component and the second zone includes the portion of the underfill layer between the plane and the substrate, and wherein applying the electric field comprises moving at least a portion of the electrically charged filler elements from the second zone to the first zone so that the first concentration of electrically charged filler elements is greater than the second concentration.

[c72] 72. The method of claim 67 wherein a plane divides the underfill layer into a first zone having a first coefficient of thermal expansion and a second zone having a second coefficient of thermal expansion, wherein the plane is generally parallel to the microelectronic component and is between the microelectronic component and the substrate, wherein the first zone includes the portion of the underfill layer between the plane and the microelectronic component and the second zone includes the portion of the underfill layer between the plane and the substrate, and wherein applying the electric field comprises moving at least a portion of the electrically charged filler elements from the first zone to the second zone so that the first coefficient of thermal expansion is greater than the second coefficient of thermal expansion.

[c73] 73. The method of claim 67 wherein a plane divides the underfill layer into a first zone having a first coefficient of thermal expansion and a second zone having a second coefficient of thermal expansion, wherein the plane is generally parallel to the microelectronic component and is between the microelectronic component and the substrate, wherein the first zone includes the portion of the underfill layer between the plane and the microelectronic component and the second zone includes the portion of the underfill layer between the plane and the substrate, and wherein applying the electric field comprises moving at least a portion of the electrically charged filler elements from the second zone to the first zone so that the first coefficient of thermal expansion is less than the second coefficient of thermal expansion.

[c74] 74. A method of underfilling a microelectronic device assembly including a microelectronic component, a substrate, and electrical couplers coupling the microelectronic component to the substrate, the method comprising disposing an underfill layer including a plurality of electrically charged filler elements between the microelectronic component and the substrate so that the filler elements are distributed generally uniformly throughout the underfill layer.

[c75] 75. The method of claim 74, further comprising manipulating at least a portion of the electrically charged filler elements.

[c76] 76. The method of claim 74 wherein the electrically charged filler elements comprise silica, and wherein disposing the underfill layer comprises disposing the underfill layer including a plurality of electrically charged silica filler elements.

[c77] 77. The method of claim 74 wherein the microelectronic component comprises a microelectronic die, and wherein disposing the underfill layer

comprises disposing the underfill layer between the microelectronic die and the substrate.

[c78] 78. A method of underfilling a microelectronic device assembly including a microelectronic component, a substrate, and electrical couplers coupling the microelectronic component to the substrate, the method comprising:

disposing an underfill layer including a plurality of electrically charged filler elements between the microelectronic component and the substrate, wherein the underfill layer has a zone having a coefficient of thermal expansion; and

changing the coefficient of thermal expansion of the zone by applying an electric field to the underfill layer to manipulate at least a portion of the electrically charged filler elements.

[c79] 79. The method of claim 78 wherein the electrically charged filler elements comprise silica, and wherein disposing the underfill layer comprises disposing the underfill layer including a plurality of electrically charged silica filler elements.

[c80] 80. The method of claim 78 wherein changing the coefficient of thermal expansion comprises moving out of the zone at least a portion of the electrically charged filler elements.

[c81] 81. The method of claim 78 wherein changing the coefficient of thermal expansion comprises moving into the zone at least a portion of the electrically charged filler elements.

[c82] 82. The method of claim 78 wherein a plane generally parallel to the microelectronic component and between the microelectronic component and the substrate defines the zone, wherein the zone includes the portion of the underfill

layer between the plane and the microelectronic component, and wherein changing the coefficient of thermal expansion of the zone comprises moving at least a portion of the electrically charged filler elements out of the zone.

[c83] 83. The method of claim 78 wherein a plane generally parallel to the microelectronic component and between the microelectronic component and the substrate defines the zone, wherein the zone includes the portion of the underfill layer between the plane and the microelectronic component, and wherein changing the coefficient of thermal expansion of the zone comprises moving at least a portion of the electrically charged filler elements into the zone.

[c84] 84. A composition for use in an underfill layer of a microelectronic device, comprising:

a flowable binder having a first state in which the binder is flowable and a second state with a greater viscosity than the first state; and

a plurality of electrically charged filler elements disposed within the flowable binder.

[c85] 85. The composition of claim 84 wherein the electrically charged filler elements comprise silica.

[c86] 86. The composition of claim 84 wherein the electrically charged filler elements comprise silicon nitride.

[c87] 87. The composition of claim 84 wherein the electrically charged filler elements comprise aluminum oxide.

[c88] 88. The composition of claim 84 wherein the electrically charged filler elements comprise aluminum nitride.

[c89] 89. The composition of claim 84 wherein the flowable binder comprises a liquid polymer.